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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,055	07/25/2005	Mohamed Mekkaoui Alaoui	128905-1005	9851

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EXAMINER	
NGUYEN, VU ANH	
ART UNIT	PAPER NUMBER
1796	
MAIL DATE	DELIVERY MODE
11/12/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/520,055	MEKKAOUI ALAOUI ET AL.	
	Examiner	Art Unit	
	Vu Nguyen	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-21,23-25 and 48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-21,23-25 and 48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of applicant's amendment to the claims. Claims 15-21, 23-25, and 48 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.,* 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 15-19, 21, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. 6,667,360) in view of Encyclopædia Britannica (www.britannica.com/EBchecked/topic/350437/lubrication/4341/Solid-lubricants).

5. Regarding the limitations set forth in these claims, Ng et al. (Ng, hereafter) teaches a polymer nanocomposite stamp comprising a polymer resin and nanoparticles

embedded in the resin (col. 2, lines 12-20). The composite material is clearly provided as a block or casting material as it is disclosed that "the mixture was poured into a preheated silicon mold and cured at 75°C for 2.5 hours and then at 120°C for 2.5 hours" (col. 6, lines 7-9). The nanoparticles have size in the range of 1-100 nm (col. 1, line 47) and an example of TiO_2 nanoparticles with average size of 32 nm is disclosed (col. 5, line 65). The amount of the nanoparticles relative to the resin is 1-50 wt% (col. 1, line 46). The nanoparticles are inherently distributed homogeneously in the resin as it is disclosed that "the TiO_2 fillers were dispersed in the epoxy by placing the mixture in an ultrasonic bath at 60°C for about one hour" (col. 6, lines 3-5). The polymer resin has, by definition, an amorphous structure, and is disclosed as an epoxy or polyurethane (col. 1, lines 48-50). It is further noted that "synthetic resins are not clearly differentiated from plastics" (Encyclopædia Britannica), and stamp is a tool used in conversion and cupping processes (Encyclopædia Britannica).

6. Clearly, Ng teaches all the limitations set forth in these claims but fails to teach inclusion of a solid lubricant in the nanocomposite.

7. It is taught in the Encyclopædia Britannica, in the sub-section Solid Lubricants under the subject Lubrication Technology, that "materials such as **graphite** and **molybdenum disulfide**, commonly called molysulfide, have a crystal lattice structure arranged in layers. Strong bonds between atoms within a layer and relatively weak bonds between atoms of different layers allow the lamina to slide on one another... Both graphite and molysulfide are chemically inert and have high thermal stability."

8. In light of such teachings and considering that the Ng disclosure is directed to nanocomposites having improved mechanical properties, increased toughness, and improved dimensional stability (col. 1, lines 39-43), it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have included at least a solid lubricant such as graphite or molybdenum disulfide in the nanocomposite taught by Ng so that the resulting stamp possesses not only improved toughness and dimensional stability but also superior thermal stability.

9. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. 6,667,360) in view of Encyclopædia Britannica (www.britannica.com/EBchecked/topic/350437/lubrication/4341/Solid-lubricants) as applied to claims 15-19, 21, and 25 above, and further in view of Fedorchenko et al. (See attached copy obtained from http://www.springerlink.com/content/v1605287484 46615/fulltext.pdf).

10. With respect to the amount of the lubricant as recited in claim 23, Fedorchenko et al. (Fedorchenko, hereafter) presents a study on the effects of filler concentration on the properties of a polymer-filler composite. The filler includes graphite and molybdenum disulfide particles. The study reveals that small-size graphite particles and molybdenum disulfide particles exhibit similar effects, wherein the hardness and shear strength of the composite decrease when the amount of the filler (i.e., the solid lubricant) is greater than 30 vol% (Fig. 3 & 4, plots 2&3) but the compressive strength of the composite is highest when the filler concentration is about 30-50 vol% (Fig. 1, plots 2&3).

11. In light of such teachings, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have employed about 30-50 wt% of the graphite or molybdenum disulfide nanoparticles in the nanocomposite taught by Ng so as to optimize the properties of the nanocomposites and the articles made thereof.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. 6,667,360) in view of the Encyclopædia Britannica, and Arpac et al. (U.S. 6,291,070).

13. Regarding the limitations set forth in this claim, the tool of claim 15 has been shown to be unpatentable over Ng in view of the Encyclopædia Britannica as discussed above. However, Ng prefers non-functionalized nanoparticles over surface-functionalized nanoparticles (col. 5, lines 14-17). The main reason for such preference is to avoid contamination by residues from chemicals used in the surface-functionalization process (col. 5, lines 17-19).

14. Arpac et al. (Arpac, hereafter) teaches a nanostructured molded article comprising a composite which comprises nanoparticles "having polymerizable and/or polycondensable organic surface groups" (Abstract). The preparation of the article involves a step of curing at a temperature of 60-150°C (col. 1, line 56). The particles comprises TiO_2 nanoparticles (col. 2, line 17) having a preferred mean diameter of 5-50 nm (col. 2, line 13). The organic groups preferably include an epoxy group (col. 3, line 5). The disclosed article is recommended for numerous uses, including casting moulds

(col. 9, line 61) and tools (col. 10, line 2). Arpac also teaches that **[Motivation]** the use of the surface-modified nanoparticles in a composite improves scratch and corrosion resistance properties of the composite (col. 9, lines 16-18).

15. In light of such benefits and considering that one of the main objectives being sought in the Ng invention is a nanocomposite with superior scratch resistance (col. 1, lines 31-32), it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified the nanocomposite taught by Ng by preparing the surface-functionalized nanoparticles as taught by Arpac, purifying them to remove unreacted residues, and replacing the nanoparticles taught by Ng with these contamination-free surface-functionalized nanoparticles so that the resulting nanocomposite and articles made thereof have improved scratch and corrosion resistance properties.

16. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ng et al. (U.S. 6,667,360) in view of the Encyclopædia Britannica.

17. Regarding the limitations set forth in this claim, the tool of claim 15 has been shown to be unpatentable over Ng in view of the Encyclopædia Britannica as discussed above. Ng fails to teach a method for converting a metal work piece using the disclosed stamp. Nevertheless, since methods of converting metal using stamps, such as by pounding, are well known, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have employed the aforementioned

lubricant-filled nanocomposite stamp for converting metal work piece since the stamp is mechanically tough, dimensionally stable, and resistant to scratch.

Response to Arguments

18. Applicant's arguments with respect to claims 15-48 have been considered but are moot in view of the new ground(s) of rejection. Since the claims have been amended and the previously applied reference Saigo et al. (US 6,214,277) is no longer employed, applicant's arguments involving Saigo (pp. 5-6) are moot. As to the applicant's argument that neither Ng nor Arpac teaches a solid lubricant (p. 7, 3rd paragraph), the deficiency has been remedied by the teachings of the Encyclopædia Britannica as set forth above.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vu Nguyen whose telephone number is (571)270-5454. The examiner can normally be reached on M-F 7:30-5:00 (Alternating Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vu Nguyen
Examiner
Art Unit 1796

/David Wu/
Supervisory Patent Examiner, Art Unit 1796